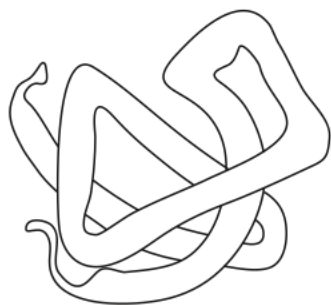


1.

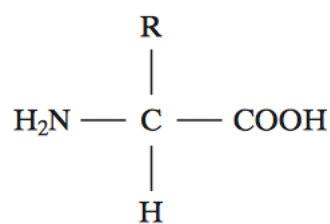
The diagrams show five molecules **A** to **E**.



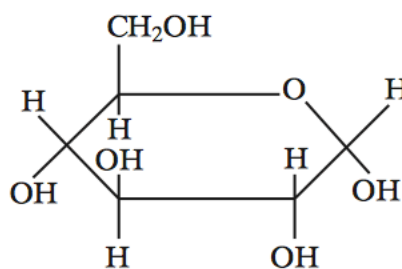
**A**



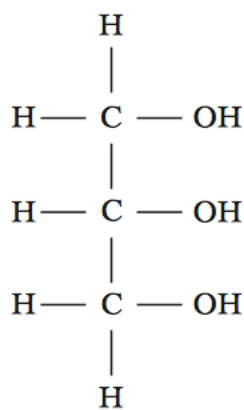
**B**



**C**



**D**



**E**

Which molecule, **A** to **E**,

- (a) is one of the monomers which combine to form starch; .....
- (b) contains peptide bonds; .....
- (c) could be an oil; .....
- (d) is one of the molecules that form a triglyceride? .....

(4 marks)

2.

- (a) (i) Describe the process by which cellulose is formed from monosaccharides.

.....

.....

.....

.....

*(2 marks)*

- (ii) Explain **one** way in which the structure of a cellulose molecule is related to its function.

.....

.....

.....

.....

*(2 marks)*

3.

- (a) Many reactions take place in living cells at temperatures far lower than those required for the same reactions in a laboratory.  
Explain how enzymes enable this to happen.

.....

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.....

.....

.....

*(3 marks)*

An amylase enzyme converts starch to maltose syrup which is used in the brewing industry.

- (b) Describe a biochemical test to identify

- (i) starch;

.....

.....

.....

.....

*(2 marks)*

- (ii) a reducing sugar such as maltose.

.....

.....

.....

.....

*(2 marks)*

**4.**

The table shows the results of biochemical tests on substances found in food.

Substance	Colour with Benedict's solution test	Colour with iodine solution test	Colour with biuret test	Appearance with emulsion test
<b>A</b>	Blue	Yellow-brown	Violet	Clear
<b>B</b>	Blue	Yellow-brown	Blue	Milky
<b>C</b>	Brick-red	Yellow-brown	Blue	Clear
<b>D</b>	Blue	Yellow-brown	Blue	Clear

(a) Identify substances **A**, **B** and **C**.

**A**.....

**B** .....

**C** .....

(3 marks)

(b) Describe a further biochemical test to find out if substance **D** is a non-reducing sugar.

.....

.....

.....

.....

(2 marks)

(c) Name the chemical elements in a non-reducing sugar.

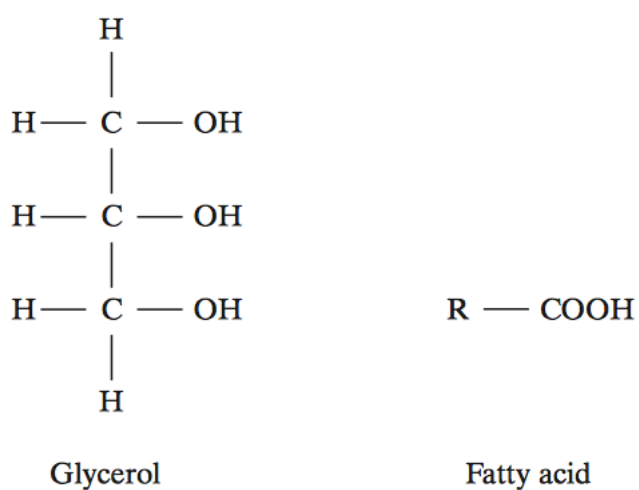
.....

.....

(1 mark)

5.

- (a) **Figure 1** shows the structure of a molecule of glycerol and a molecule of fatty acid.



**Figure 1**

Draw a diagram to show the structure of a triglyceride molecule.

(2 marks)

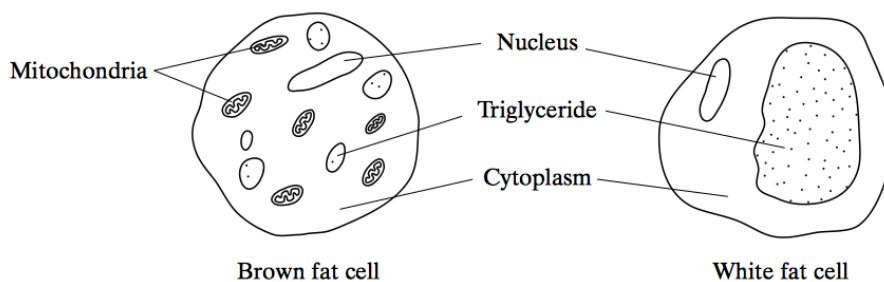
- (b) Explain why triglycerides are **not** considered to be polymers.

.....

.....

(1 mark)

- (c) **Figure 2** shows two types of fat storage cell. Mammals living in cold conditions have more brown fat cells than mammals living in tropical conditions.



**Figure 2**

Using evidence from **Figure 2** to support your answer, suggest how the function of brown fat cells differs from that of white fat cells.

.....

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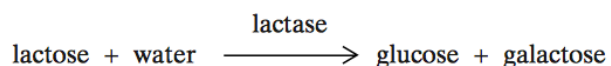
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(3 marks)

6.

Lactose is a disaccharide sugar which can be broken down by the enzyme lactase into two monosaccharides, glucose and galactose.



- (a) The formula for galactose is  $\text{C}_6\text{H}_{12}\text{O}_6$ . What is the formula for lactose?

.....  
(2 marks)

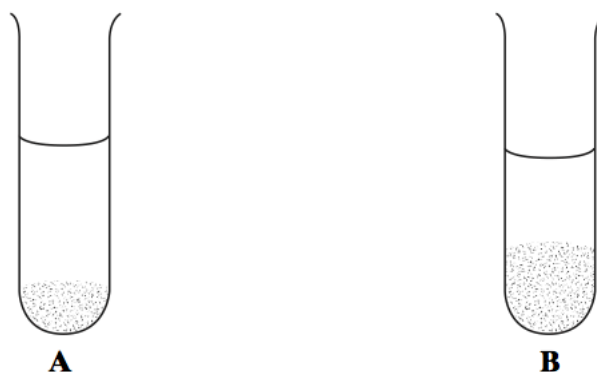
- (b) A solution containing the enzyme lactase was added to a lactose solution. The solution was incubated at  $40^\circ\text{C}$  for one hour. Sample **A** was removed from the tube before incubation. Sample **B** was removed after one hour.

- (i) Describe a chemical test you could carry out on sample **A** to show that lactose is a reducing sugar.

.....  
.....  
.....  
.....  
(2 marks)



- (ii) This chemical test was carried out on samples **A** and **B**. All experimental variables were the same in the testing of the two samples. Both tubes were left for ten minutes to allow the precipitate to settle. The diagram shows the result.



Is galactose a reducing sugar? .....

Explain how the results in the diagram support your answer.

.....

.....

.....

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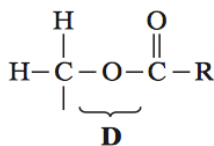
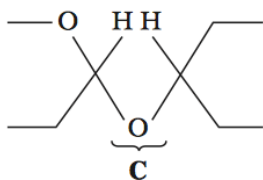
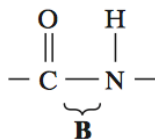
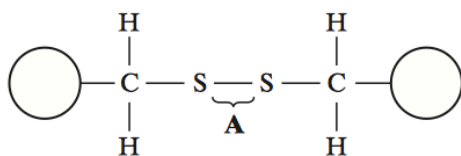
(2 marks)

7.

The diagrams show four types of linkage, **A** to **D**, which occur in biological molecules.

Amino acid

Amino acid



- (a) Name the chemical process involved in the formation of linkage **B**.

.....  
(1 mark)

- (b) Give the letter of the linkage which

- (i) occurs in a triglyceride molecule;

.....  
(1 mark)

- (ii) might be broken down by the enzyme amylase;

.....  
(1 mark)

- (iii) may occur in the tertiary, but not the primary structure of protein.

.....  
(1 mark)

- (c) Describe how a saturated fatty acid differs in molecular structure from an unsaturated fatty acid.

.....

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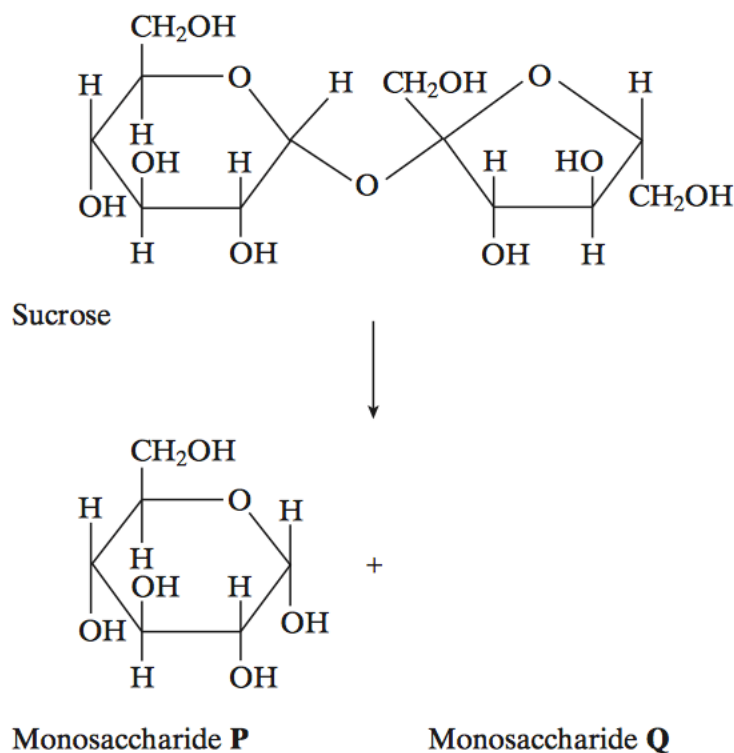
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*(2 marks)*

**8.**

Sucrose is a disaccharide. It is formed from two monosaccharides **P** and **Q**. The diagram shows the structure of molecules of sucrose and monosaccharide **P**.



- (a) (i) Name monosaccharide **Q**.

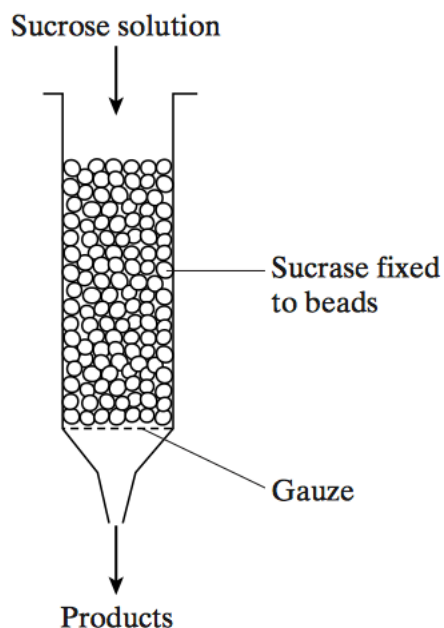
.....  
(1 mark)

- (ii) Draw the structure of a molecule of monosaccharide **Q** in the space above.  
(1 mark)

- (b) The enzyme sucrase catalyses the breakdown of sucrose into monosaccharides. What type of reaction is this breakdown?

.....  
(1 mark)

- (c) The diagram shows apparatus used in breaking down sucrose. The enzyme sucrase is fixed to inert beads. Sucrose solution is then passed through the column.



Describe a biochemical test to find out if the solution collected from the apparatus contains

- (i) the products;

.....

.....

.....

.....

(2 marks)

- (ii) the enzyme.

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.....

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.....

(2 marks)